

APPLICATION

OF

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FOR

UNITED STATES LETTERS PATENT

ON

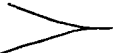
TELEPHONIC-INTERFACE STATISTICAL ANALYSIS SYSTEM

DOCKET No. 3194-102A2

NO. OF DRAWINGS Six (6)

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TELEPHONIC-INTERFACE STATISTICAL ANALYSIS SYSTEMBackground and Summary of the Invention

*Ans. A1* 

This is a continuation-in-part of Application Serial No. 018,244 filed February 24, 1987, and entitled "Statistical Analysis System For Use With Public Communication Facility" which was a continuation-in-part of Application Serial No. 753,299 filed July 10, 1985 and entitled "Statistical Analysis System For Use With Public Communication Facility".

Various forms of publicly accessible communication systems for providing access to a central station have been proposed, some involving telecommunications. However, sometimes a need for ancillary functions arise in that regard, e.g. it may be desirable to positively identify a large group of persons, as a demographically controlled group, or a specifically entitled group, then statistically analyze data from the group so as to accurately identify certain persons in the group and select a subset of at least one person. Specifically, it may be desirable to obtain medical data from an entitled group of people, to correlate such data, perhaps introduce external data, then identify a select subset of the group. In that regard, a need exists for an improved, effective, economical, and expedient system of telecommunication

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incorporating means for performing qualification, identification, analysis and selection of individual persons.

5 It has been proposed to interface persons at telephone calling stations directly with a computer facility. In accordance with such arrangements, recorded voice messages prompt callers to provide data by actuating the alphanumeric buttons that are conventionally employed for dialing from one telephone  
10 station to another. In one prior arrangement, a caller may actuate dialing buttons to selectively attain a communication channel or to address specific information in a computer. In another arrangement, dialing buttons may be actuated to specify a billing designation as for requested services. Generally, such  
15 systems are believed to have been somewhat limited in scope, often involving difficulties that are frustrating or confusing to a caller. Nevertheless, such techniques have been widely used to enhance and broaden  
20 communication.

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In general, the present invention comprises a telephonic-interface system and related process for selectively utilizing both analog (voice) and digital telephonic communication in a variety of different  
25 interface formats or programs, as to select or qualify a set of callers, enable positive identification of at least certain of the callers in the set, acquire data from callers in the set, statistically analyze acquired data, as in combination and in association with  
30 external data (time independent), and accordingly to isolate a subset of the callers with verifiable identification. That is, the external data (separate from caller-provided data) may be introduced at any of a variety of different times in relation to the caller  
35 data.

For example, a voice origination apparatus may prompt individual callers who (after qualification) provide select digital data to develop a record for further processing either immediately, upon the evolution of a defined set of callers or upon the establishment of select external data. Thus, following a qualification phase, the information acquisition phase may be concurrent or consecutive with respect to the processing phase. When appropriate, abort capability allows a caller to remain "off hook" and go to analog (vocal) communication. The caller then interfaces directly with an operator.

The system of the present invention may qualify an entitled set of callers, then receive answer data in the course of the call and develop identification or designation data, sequence data and statistical data. The system may then provide data cells for storing individual data while assigning confirmable identifications to the entitled set. From the set, a subset is defined. That is, in accordance with various formats, acquired data is processed in statistical relationship, or in relation to applied external data to accomplish such functional operating formats as an auction sale, a contest, a lottery, a poll, a merchandising operation, a game, and so on.

A variety of memory techniques are used to selectively activate the voice origination apparatus. Accordingly, statistical analysis and selection can be effectively and economically accomplished with respect to a substantial set of callers who are accommodated individual communication through a telephone system.

#### Brief Description of the Drawings

In the drawings, which constitute a part of this specification, exemplary embodiments exhibiting

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various objectives and features hereof are set forth, specifically:

FIGURE 1 is a block diagram of a system constructed in accordance with the present invention;

5           FIGURE 2 is a fragmentary diagrammatic representation of a storage cell format as may be developed in the system of FIGURE 1;

FIGURE 3 is a flow diagram of one operating format of the system of FIGURE 1;

10           FIGURE 4 is a block diagram of a form of processor or function unit as may be employed in the system of FIGURE 1;

15           FIGURE 5 is a fragmentary diagrammatic representation of a storage cell format as may be developed in the system of FIGURE 1 with the processor of FIGURE 4;

FIGURE 6 is a block diagram of elements in an operating function unit of FIGURE 4;

20           FIGURE 7 is a diagrammatic representation of a storage cell format as may be developed in the system of FIGURE 4; and

FIGURE 8 is a block diagram of elements in an operating function unit of FIGURE 4.

25           Description of the Illustrative Embodiments

As required, detailed illustrative embodiments of the present invention are disclosed herein. However, physical communication systems, data formats, and operating structures in accordance with the present invention may be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiments. Consequently, the specific structural and functional details disclosed herein are merely representative; yet in that regard, they are  
30  
35           deemed to afford the best embodiments for purposes of

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disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIGURE 1, a series of remote telephone-instrument terminals T1 through Tn are represented (left). The terminals are generally similar, and accordingly, only the terminal T1 is illustrated in detail.

In the disclosed embodiment, the remote terminals T1 through Tn represent the multitude of conventional telephone terminals that are coupled to a communication facility C which may take the form of a comprehensive public telephone system for interconnecting any associated terminals T1-Tn. In accordance with the present system, the terminals T1-Tn operate through the communication facility C to be coupled with a central station D, an embodiment of which is illustrated in some detail.

Generally in accordance with the present development, individual callers use the individual telephone stations T1 through Tn to interface the station D through the communication facility C. Callers may be screened or qualified. Also in accordance herewith, the data of individual callers may be collected, correlated and tested in the station D for processing in accordance with various programs and external data. As a consequence, various objectives are accomplished. For example, a select subset of the callers may be isolated and specifically identified, or related data may be processed, or transactions may be actuated. The possibilities for application of the system are substantial and varied as will be apparent from the exemplary structure and functions as described in detail below.

In one operating process format, the public might be polled with regard to locating the specific

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purchasers of a defective or dangerous product. Alternatively, the public might be polled with the objective of locating persons susceptible to a specific ailment or disease. Public auctions of unprecedented participation are possible. Legal lotteries are enabled that are interesting, effective and very economical on an individual participant basis. The system also might be employed in various game formats or to automate a promotion or mail-order operation, even to the extent of including inventory control as detailed below.

In each functional operating format, the callers may be variously qualified on the basis of entitlement and may be identified for subsequent verification. The callers then may be prompted, either through the interface or externally, to provide appropriate data.

Considering the system of FIGURE 1 in somewhat greater detail, it is to be understood that the communication facility C has multiplexing capability for individually coupling the terminals T1-Tn to the central station D on request. In the illustrative embodiment of the system, the communication facility C comprises a public telephone network and the individual terminals T1-Tn take the various forms of existing traditional or conventional telephone instruments.

The exemplary telephone terminal T1 is represented in some detail to include a hand piece 10 (microphone and earphone) and a panel 12 provided with a rectangular array of push buttons 14 in the conventional configuration. Of course, the hand piece 10 accommodates analog signals while the panel 12 is a digital apparatus. Generally in accordance herewith, the hand piece 10 serves to manifest analog signals vocally to the caller.

In accordance with conventional telephone practice, alphabetic and numeric designations are provided on the buttons 14. For example, several of the buttons 14 carry three letters along with a decimal digit. Specifically, the button designated with the numeral "2" also carries the letters "A", "B" and "C". In that manner, the buttons 14 encompass the numerals "0-9", two symbols, and the alphabet except for the letters "Q" and "Z". Consequently, the buttons 14 accommodate the entry of decimal data, and to some extent alphabetic data.

The buttons 14 designated with symbols "\*" and "#", along with the numeral "0", can be used by predetermined assignment to represent the letters "Q" and "Z" or any of a variety of other data or command components. Generally, in accordance herewith, the buttons 14 are employed to formulate digital data at the central station D in various formats determined by the instant specific use and operating format of the system.

Considering the central station D in somewhat greater detail, the communication facility C is coupled to interface a series of processing systems P1 through Pn (FIGURE 1, left). Specifically, the communication facility C is connected to the processing systems P1-Pn through an associated series of automatic call distributors AC1 through ACn. Each of the automatic call distributors AC1-ACn accommodates one hundred lines from the communication facility C and accordingly, may accommodate and queue up to 100 calls.

Each of the automatic call distributors AC1-ACn may take various forms as well known in the prior art, functioning to queue incoming calls for connection to a lesser number of lines. In the disclosed embodiment, from each of the call distributors AC1-ACn, fifty

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lines are connected respectively to the individual data processing systems P1-Pn through an interface 20 and a switch 21. Thus, in the disclosed embodiment, each of the automatic call distributors AC1-ACn can accommodate one hundred lines, fifty of which may be active in association with one of the processing systems P.

The processing systems P1-Pn are similar, therefore, only the processing system P1 is shown in any detail. Collectively, the processing systems P1-Pn are interconnected with a command computer terminal CT, at least one interface terminal IT, at least one printer PR and an audio unit AD. The command terminal CT is separately coupled to the audio unit AD.

As represented, the processing systems P1 through Pn each contain a number of individual function units or processors PR1 through PRn. Although various other configurations and arrangements may be employed, the explanation is facilitated by including a plurality of individual function units as treated in detail below.

Considering the processing system P1, fifty lines from the automatic call distributor AC1 are connected to the interface 20, an exemplary form of which may be a commercially available Centrum 9000 unit. The interface 20 incorporates modems, tone decoders, switching mechanisms, DNIS and ANI capability (call data analyzer 20a) along with voice interface capability. Note that the interface may actually perform analysis on data. However, to preserve the disclosed embodiment manageable, major analysis is explained with reference to processors.

Generally, DNIS capability is a function of the communication facility C (composite telephone system) to provide called terminal digital data indicating the called number. ANI capability is a

similar function whereby the digital data indicates the calling number with calling terminal digital signals. Both capabilities are available for use with equipment as the interface 20 and to provide control through the call data analyzer 20a.

Accommodating up to fifty independent calls on separate communication paths to the central station D, the interface 20 is capable of providing analog (voice) signals to prompt each caller. Also accommodated are digital signals including the DNIS and ANI signals. The system contemplates the possibility of utilizing sequences of lines in rotary as well as blocking sequences of lines, the numbers for which command a particular program or operation format of a function unit as disclosed in detail below.

The interface 20 provides the connection of the fifty lines to a switch 21 which is in turn coupled to fifty function units, or processors PR1-PRn. As indicated above, multiple function units, or processors, are described in the disclosed embodiment to facilitate the explanation. Of course, non-parallel techniques and multiplexed operations might well be employed as alternatives. For a similar reason, as disclosed herein, each of the processors PR1-PRn includes memory cells for each of the callers' individual data. Development and compilation of data in such cells according to various operating formats is described below. In the disclosed embodiment, the processors PR1-PRn are connected collectively to the command computer terminal CT (incorporating a CRT display), the interface terminal IT, and the printer PR. Note that the CRT display serves to visually display data regarding select subsets as explained in detail below.

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Exemplary detailed structures for the processors PR1-PRn are described below; however, in general, the units may comprise a microcomputer, for example, programmed as suggested above and as disclosed in detail below to accomplish specific operating formats. As an integral part of such formats, a caller may be qualified as belonging to an entitled set of persons or to accommodate specific demographic objectives. Also, callers may be designated both with respect to their significance and their identification. For example, callers may have different significance in a format, depending on the time or sequence of their call. Also, the designation of a caller may be exceedingly important in relation to the caller eventually being isolated as part of a subset, the members of whom must be accurately verified. As described below, the designations may involve multiple elements which may include: random number assignments, encryption techniques, utilization of calling numbers, identification data, sequence of call and so on to facilitate reliable verification. Note that the communication facility C has a customer billing structure B that is interfaced by the system.

On the qualification and designation of callers, the system enters a data accumulation phase during which digital data (formatted at one of the telephone terminals T1-Tn) is processed by one of the processors PR1-PRn. In general, the processing evolves a subset (at least one caller) the members of which may be verified and confirmed.

Sub D  
Either during the data accumulation phase, or after the processing phase to isolate a subset, a distinct operation may involve actuating the interface terminal T1 for direct local communication between the caller and an operator at the terminal T1. Another

distinct operation may involve actuation of the printer PR to provide documents in relation to the operating format, as for providing award certificates as for verifying members of an isolated subset. Also, charge  
5 slips may be generated containing at least part of the data of a particular transaction.

An appreciation of the philosophical operation of a system in accordance with the present invention may now be enhanced by considering an  
10 exemplary operation of the illustrative embodiment of FIGURE 1 to isolate a subset of people who are susceptible to a particular disease or infirmity. The exemplary operation might involve a geographical area, as a large city or population center, in which a  
15 particular health problem is somewhat acute. For example, a major population center might be polled where coronary artery disease is a significant problem. Accordingly, persons most susceptible to such disease could be identified for corrective recommendations.

20 People of the population center could be informed of the availability of a service for statistical health analysis. Accordingly, persons interested in their individual statistical situation would be motivated to utilize the service. Specifically,  
25 individual callers would use the remote terminals T1-Tn to contact the central station D through the communication facility C and thereby provide personal information that would enable a statistical analysis in relation to existing data so as to isolate and inform  
30 (either real time or batch basis) those persons statistically most likely to be in need of corrective measures. In such applications, it may be important that the caller's identity be subject to reliable verification. Other applications or programs also may  
35 present a critical need for positively verifiable

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An exemplary operation of the system, with regard to a specific caller, will now be treated referring somewhat concurrently to FIGURES 1, 2 and 3. As indicated above, FIGURE 2 indicates a data storage format for a memory cell in an exemplary processor PR and now will be considered with regard to an operating format in which data is composed for a caller. Pursuing the above example, assume the existence of a caller at the remote terminal T1 (telephone number (213) 627-2222) who wishes to pursue health-related information on the basis of statistical analysis. The caller lifts the hand piece 10 and in accordance with conventional techniques actuates the push buttons 14 to call for a select operating format, e.g. telephone number (213) 627-3333 and thereby establish communication through the facility C with a designated function unit in the central station D. Receiving the call signal, the automatic call distributor AC1 associates the called number ((213) 627-3333, rendered available using standard telephone DNIS techniques) through the interface 20 and the switch 21 to attain connection with the specific processor, e.g. the processor PR1 formatting the health-related program. Accordingly, the processor PR1 cooperates with the interface 20 to cue the interface 20 to operate as a voice generator.

The sequence of operations is represented to be initiated in FIGURE 3 by the "enter" block 40 which is accordingly followed by a "cue voice generator" command block 42. If the ANI equipment is not employed, the voice generator in the interface 20 formulates speech, a representative form of which might be: "Thank you for participating in the coronary artery disease statistical analysis. Please give us your

telephone number by actuating the call buttons on your telephone instrument."

Acting on the instructions, the caller would push the buttons 14 in sequence to indicate his  
 5 telephone number, e.g. "(213) 627-2222". Alternatively, the interface 20 can accept the calling number ((213) 627-2222) according to its provision by standard ANI equipment of the communication facility C.

The resulting data signals are communicated  
 10 from the interface unit 20 (FIGURE 1) to the processor PR1 for testing the telephone number as valid or entitled. Essentially, the format of a proper number prompts production of a valid or "good" signal. The test is indicated by the block 44 (FIGURE 3). If the  
 15 response is not valid or entitled, for example contains an inappropriate number of digits or has been used to a point of excess, the operation of block 46 is initiated again cuing the voice generator 30 (FIGURE 1). The voice generator accordingly instructs the caller, e.g.:  
 20 "You have not entered a proper telephone number. Please reenter your telephone number by pressing the appropriate call buttons." The caller is then allotted a predetermined period of time to make a proper entry with the consequence that the system moves to a test  
 25 operation as indicated by the block 48 (FIGURE 3). Specifically, block 48 poses the query: "Is the second try good?"

If the caller is again unsuccessful, the system purges the record as indicated by the block 50  
 30 and the call is terminated as indicated by the block 52. In an alternative mode, the processor PR1 may abort the interface and couple the interface terminal IT for direct personal communication with the caller. The interchange would then proceed, person-to-person.

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5 That is, the caller's telephone number is recorded in  
an assigned specific memory cell identified with the  
caller. The format of the cell C1 is indicated in  
FIGURE 2. The first portion, section 53, contains a  
form of identification data, i.e., the caller's  
10 telephone number, i.e. "(213) 627-2222".

15

20

30

35 telephone buttons to indicate initials of your name."

The detailed operation is not represented in FIGURE 3 as it is similar to the operation illustrated by the blocks 42 through 54. However, again, a proper response is registered in the storage cell C1 as  
 5 illustrated in FIGURE 2 by the number "53" also registered in the first section 53 of the cell.

The cycle of obtaining digital information from the caller next is repeated with respect to answer data, i.e. specific health data. For example, as  
 10 illustrated in FIGURE 2, the next section 58 in the cell C1 receives an accumulation of health data, including the caller's age, weight, ..., pulse rate, and so on. Representative digital numbers are illustrated in FIGURE 2.

15 During the course of the telephonic communication, the processor PR1 formulates identification data for the caller specifically including: the chronological sequence of the call, the assigned designation of the call, and a set of acknowledgment  
 20 digits for the call. Such data identification is registered in the caller's assigned cell C1 in accordance with the format of FIGURE 2 being stored in sections 62, 64 and 66. Note that the data may be stored in a coded interrelationship. For example, the  
 25 acknowledgment digits may be related to the call record sequence. In the illustrative example, the chronological order number of the caller is 4951. The acknowledge digits may be derived from the sequence number. For example, as illustrated, a coded relation-  
 30 ship may be established by adding "two" to each of the individual record sequence digits. Considering the example numerically:

	4951
	<u>2222</u>
35 Adding without propagated carries:	6173

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Note that the confirmation data as acknowledgement digits can be extremely important, as to communicate with an isolated member of a subset. For example, identification could be published or circulated, as by a television broadcast, then respondents checked by use of confirmation data that may be confidential.

Continuing with the above example, the call chronological sequence registered for the caller is 4951 as represented in the section 62 while the acknowledge digits are 6173 as registered in the section 66. Additionally, the processor PR1 develops an assigned designation number, e.g. designation "4951684", which is registered in the section 64, the acknowledge code or digits, e.g. 6173, being registered in the section 66. These values are formulated in accordance with conventional number techniques during the data acquisition phase. With the exemplary numerals formulated, the operation proceeds.

The processor PR1 (FIGURE 1) cues the internal memory. That operation is indicated by the block 68 (FIGURE 3). Thus, the processor PR1 fetches the call record sequence number, assigns a designation (if not previously assigned), and encodes the sequence number as the acknowledgment digits (if not previously accomplished). These operations are indicated by the block 70 (FIGURE 3).

Next, the processor PR1 (FIGURE 1) cues the voice generator in the interface 20, as indicated by the block 72 (FIGURE 3) to provide information to the caller. Specifically, for example, the voice generator in the interface 20 (FIGURE 1) might signal: "This transaction has been designated by the number 4951684, and is further identified by the acknowledgment digits 6173. Please make a record of these numbers as they

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Please acknowledge this transaction by pressing your telephone buttons to indicate the acknowledge digits 6173." In various applications as those involving security, the order and acknowledgment of callers may be very important. Therefore, data for confirmation associated with the order is important.

The system next proceeds to the test mode as indicated by the block 76 (FIGURE 3). If the caller provides the correct acknowledgment digits, the data is confirmed in the record as indicated by the block 80 and is registered in the cell C1 (FIGURE 2). Additionally, the voice generator is sequenced as indicated by the block 82 (FIGURE 3) to indicate the close of the communication and that the transaction is terminated as represented by the exit block 84.

SubD2) In the event that a caller cannot confirm his acknowledgment digits, as indicated by the block 76, a repeat operation is performed as indicated respectively by the blocks 86 and 88. Specifically, the voice generator is queued for a second instructional message. In the event that the second attempt also fails, the data is purged and the call discounted as indicated by block 90 and an exit block 92. If the second try is successful (test block 88), as indicated by the block 80, the record is perfected as indicated above.

As a result of the likelihood of a large number of calls, as described above, data cells in the processors PR1-PRn (FIGURE 1) are developed with specific information indicative of a statistical sampling of the populace of concern. The data of that statistical sampling may be self-generating of specific conclusions with respect to a subset of individuals, and/or supplemental data to clearly manifest a signi-

ficant subset. For example, the data may indicate a significant departure from an assumed normal characteristic. Such data, accumulated from the polling may be considered by logic comparisons in the computer 22 to select the subset of persons who should be isolated.

In addition to the self-generating conclusions available from the received data, the system may involve the introduction of external data. In the physical fitness example, such external data might take the form of national statistical data. In any event, the processing operation usually involves comparison testing which compares caller data from individual memory cells of the processors P1-Pn (FIGURE 1) with test data that is supplied through the command terminal CT.

In the above example, members of the public in general were invited to use the service. A number of alternatives exist which might well impact on the statistical analysis. For example, a list may be preserved by a use-rate calculator to implement a consumable key operation. That is, a user is qualified to a specific limited number of uses during a defined interval.

As another example, callers might be restricted to the purchasers of a specific product as a medical apparatus for measuring blood pressures, heart rates, or so on. In such situations, it will be apparent that the statistical data will be somewhat distorted from an average or normal sampling. Clearly, the processors P1-Pn can be programmed to take into account such considerations. In that regard, the processors might also verify identification data proffered by a caller. Such data might take the form of a credit card number or a personal identification

number. Methods for verification of such numbers using computer techniques are discussed below.

As indicated above and detailed below, the system can be programmed or formatted for use in a variety of applications. Preliminary to considering exemplary forms of such applications, reference will now be made to FIGURE 4 showing an exemplary structural form for the processors PR1-PRn. From the switch 21 (FIGURE 1) a pair of communication lines 90 and 91 are indicated in FIGURE 4 (top left). The line 90 provides signals from a processing unit 92 while the line 91 provides signals to the processing unit 92 along with other components as represented in FIGURE 4. The separate lines 90 and 92 facilitate explanation.

The processing unit 92 may take the form of a mini-computer programmed to accommodate the functions of various applications, as disclosed in detail below. As indicated above, the system may utilize a plurality of independent function units or processing units, e.g., processing unit 92, operating in a somewhat parallel configuration, or alternatively, a limited number of processors may be driven sequentially to accommodate the functional operations as described.

The input line 91 (upper left) is connected specifically to a qualification unit 93, a sequencer 94 and a designation unit 96, as well as the processing unit 92 as indicated above. The qualification unit qualifies access from a remote terminal T1-Tn to the processing unit 92 as described in detail below. In accordance with various applications or operating formats, the qualification unit 93, the sequencer 94 and the designation unit 96 operate preliminarily with respect to individual callers. Generally, these units qualify or test callers for entitlement, develop a sequence-of-calls record and provide forms of designa-

tions for callers that may be authenticated. As described in detail below, the units function in sequence to accomplish such operations and accordingly are each individually connected to the processing unit 92 and a buffer storage 97. Essentially, the buffer storage 97 is illustrated separately from the processing unit 92 along with the unit 93, sequencer 94, unit 96, and so on, again in order to facilitate the explanation. Similarly illustrated are a memory 98 (with cells C1-Cn), a look-up table 103 and a clock 105.

Considering the processor of FIGURE 4 in further detail, the qualification unit 93 (upper left) is connected to a look-up table 99 and a use-rate calculator 100. The designation unit 96 (top center) is connected to a random number generator 101 and an encryptor 102.

In view of the above structural description of the system, consideration will now be given to certain specific applications in relation to the operation of the system. In that regard, the operation of the system will next be considered to automate a mail-order facility.

Assume that a caller at a terminal T1 (FIGURE 1) dials a specific number to identify a mail order interface with the system of FIGURE 1. For example, assume the telephone number "(213) 627-4444" for such an interface. Accordingly the caller dials the number at the remote terminal T1. As a result, the communication facility C couples the terminal T1 through the automatic call distributor AC1, the interface 20 and the switch 21 to a select processor PR1 identified and programmed for a mail-order operating format. Note that the communication facility C provides the dialed number ("(213) 627-4444") to the processing system P1

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through well known telephonic equipment DNIS. Accordingly, a program is selected to execute the mail order interface.

As a preliminary action, a voice responder  
5 in the interface 20 might be cued by the processing  
unit to identify the mail-order house and indicate that  
the order will be taken by computer. Either before or  
after qualification, the caller might be advised that  
10 if he prefers to communicate directly with a person,  
or needs such contact at any point in the communi-  
cation, he may accomplish it simply by pushing the  
asterisk button (\*) at the terminal T1. Such action  
forms an abort signal that is detected by the process-  
15 ing unit 92 to transfer the communication to the  
interface terminal IT (FIGURE 1). Alternatively, the  
customer may be asked (by voice cue) to provide  
detailed information as name, address, etc. which is  
recorded for later processing.

After the preliminary information is supplied  
20 to a caller, the qualification phase is initiated. For  
example, the interface 20 might actuate the terminal T1  
to announce: "Please indicate the type of credit card  
you will use for your purchase by pushing the button  
number 'one' for Mastercharge, 'two' for....."

25 The caller's response, indicating a specific  
credit card, will be stored in a data cell; however,  
the data is developed initially in the buffer 97. The  
format and data for the present example (in the buffer  
97) will be explained with reference to a storage block  
30 format 104 as illustrated in FIGURE 5. The first data  
block 130 accordingly registers a digit to indicate the  
card that will be used to support the caller's pur-  
chase.

Using voice prompt, the interface 20 next  
35 instructs the caller to use the telephone buttons to

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indicate his credit card number and the expiration date of the card. That data is stored in the register 104, specifically in the blocks 132 and 134 as illustrated in FIGURE 5.

5               Next, the caller is asked for his customer number, as it may appear on his catalog. That number is stored in a block 136 of the block format register 104. Note that the caller may not be identified in the files of the mail-order house and in that event, the  
10              operation may be shifted to a manual operation to be continued through the interface terminal IT (FIGURE 1) as explained above. For a television-initiated mail-order transaction, other numerical codes might be  
15              employed as to key into broadcast schedules. For example, a code might be used to indicate program times and thereby enable evaluation of the productivity of such program times. Such operation may be performed during the designation phase as described below.

              To continue with the explanation of the  
20              automated format, assume that the customer has a file customer number and that it is stored in the block format register 104 along with his credit card number and expiration date. From that location, the data is checked by the qualification unit 93 (FIGURE 4) for  
25              propriety as part of the test or qualification phase of operation. The check or test is in two stages and both are performed during an interval designated t1, the qualification unit 93 operating under control of the processing unit 92.

30              First, the data is verified as representing valid and proper data formats for the customer's number, the credit card number and expiration date. The second operation involves consulting a so-called negative list to assure that the identified card and  
35              customer's number have not been cancelled, as for

example in the case of credit cards that have been lost or stolen. Detailed structure for such tests is described in the parent case from which this case continues and may be incorporated in the qualification unit 93.

With the successful completion and verification of the preliminary data in the block format register 104, the qualification phase of operation is concluded and the system next interfaces with the caller to acquire and process data for a specific order of merchandise. Note that in the mail-order operating format, the sequence of the call is not normally significant. However, the sequencer 94 may log the time during a period  $t_2$  if deemed worthwhile.

Somewhat as described above in relation to the initial operating format (health poll), the voice generator in the interface 20 prompts the caller through a series of exchanges that load the storage block format register 104 with a merchandise order. Thus, as purchase items are confirmed, the register 104 is loaded as exemplified by the blocks 140 and 142. The interchange continues until the customer indicates he does not wish to order any additional items. The system then operates the designation unit 96 (FIGURE 4) during the interval  $t_3$  to develop and announce the acknowledgement digits as stored in the block 144 (FIGURE 5). The acknowledgement digits serve to identify the order both for the caller and the mail-order house. Accordingly, tracing is facilitated. The data (FIGURE 5) is then transferred from the buffer 97 (FIGURE 4) to a select memory cell C1-Cn.

During the next interval  $t_4$ , the processing unit 92 (FIGURE 4) isolates data of the cells C1-Cn to facilitate the mail-order process. In that regard, the

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processor 92 may incorporate structure and processing techniques as disclosed in the parent case.

Of the wide variety of other operating formats and applications in accordance herewith,  
5 further examples will now be described with reference to the systems of FIGURES 1 and 4. However, from a consideration of the operating formats treated below, it will be apparent that certain structural elements have reoccurring significance in the combination.  
10 Specifically, such elements include the structures:  
(1) utilizing the called number to select a specific operating format, (2) for screening or selecting callers who will be accepted based on various criteria, (3) for designating callers in a manner to enable  
15 subsequent positive identification and (4) various processing aspects of the data manipulations including the provision of at least a portion of certain ID data provided directly from the telephone apparatus. With respect to the data processing, distinctive elemental  
20 features include the utilization of external data not available during the interval of gathering data, the utilization of an interrelationship between the composite data collected during a data acquisition period, and the operation of utilizing time or sequence  
25 of callers to accomplish a subset.

As the next illustrative operating format, an instant lottery system will be described. Accordingly, assume the existence of a legalized state lottery accommodated by the telephone system utilizing a pay-  
30 to-dial number ("(213) 976-xxxx") and restricted to a limited number of uses for defined intervals of time. For example, a person might be entitled to play the lottery a limited number of times or to the extent of a limited dollar value during a predetermined interval.

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From the terminal T1 (FIGURE 1) the caller would actuate the push buttons 14 to establish contact with the processing system P1 coupling would be through the communication facility C, the automatic call distributor AC1, the interface 20 and the switch 21 as described in detail above. The initial operation then involves qualification of the caller to participate in the instant winner lottery. Again, ANI or caller interface techniques may be employed. If the caller is involved, the interface 20 is actuated by the qualification unit 93 during the operating interval t1 to instruct the caller: "Please key in your telephone calling number". As indicated above, an alternative involves the system simply registering the calling number on the basis of its provision by ANI equipment.

In any event, after the caller's telephone number is registered, the instruction is given: "Participation in instant winner lottery is for persons over twenty-one years of age. Accordingly, please key in the year of your birth". A driver's license or credit card number may be similarly registered to confirm age. Alternatively, the combination of telephone number and date of birth could be used. In any event, the caller's data is registered and the qualification unit 93 then functions to test the data as provided. Specifically, the caller's telephone number is checked in a look-up table 99 to determine whether or not it is a proper and currently valid number for use in the lottery. Concurrently, the number is checked by the use-rate calculator to determine the number of times it has been used in excess of a predetermined number of calls or dollar value to participate in the lottery during a current interval of monitoring.

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If the data indicates a qualified caller, the system proceeds to the next phase of designating the transaction. Note that the sequence is not significant in this operating format with the consequence that the interval t2 and the operation of the sequencer 94 may be bypassed. Rather, the designation unit 96 operates during the interval t3 to provide the caller with a designation for the current transaction and if applicable, updates the file as to current use or dollar value remaining for the caller's use. As explained above, the random generator 101 with or without the encryptor 102 may be employed to create an identification number which may include an encrypted form of the caller's telephone number. Accordingly, data for the transaction is established in the buffer 97 then set in a cell of the memory 98 (FIGURE 4). Specifically, the completed data cell format might be as follows:

Telephone No. - Birth Year - Designation - Random No.

The system next functions to generate the random number as indicated above which will then be tested against a series of other numbers to determine whether or not the caller is a winner. In that regard, elements in the processing unit 92 which accomplish the operation are illustrated in FIGURE 6 which will now be considered in detail.

A random number generator 160 functions on command to provide a three-digit number. With the consummation of a call, the random number generator 160 is actuated to provide the caller's random number in a selected caller cell 162. From that location, the caller's random number is compared with numbers from a register 164 by a comparator 166. The numbers in the register 164 were previously passed through a gate 174 from the generator 160. In the event of coincidence, the comparator provides an output "yes" signal to a

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line 168. Conversely, the failure of coincidence prompts the comparator 166 to provide a "no" output to a line 170. Essentially, a "yes" indicates a win while a "no" indicates the caller has lost.

5           The elements of FIGURE 6 provide a random operating format to determine winners on a somewhat statistical basis; however, the system increases the probability with the passage of time when no win occurs. In that regard, at the outset of an operating  
10 cycle, the random number generator 160 provides a random number that is passed through the gate 174 to the register 164. In the exemplary format, a three-digit number would be provided. At that stage, the caller's random number, from the cell 162, would be  
15 compared with the single number in the register 164 by the comparator 166. However, with the passage of time, calls are tallied or time is metered by a counter 178. Accordingly, upon the attainment of a predetermined count, the gate 174 is again qualified to enter another  
20 number in the register 164. Accordingly, an increasing set of numbers are held in the register 164 for comparison with each caller's number. Of course, the more numbers in the register 164, the higher probability of a caller winning and that relationship  
25 depends upon the duration or number of calls since the last winner.

          Either a win or a loss as indicated within the processing unit 92 (FIGURE 4) prompts the interface  
20 to respond appropriately to the caller announcing his results. If there is a win, the designation may be  
30 reinforced and additional identification may be taken as explained above. Of course, if the prize simply involves a credit on the caller's telephone bill or his credit account, identification and designation become  
35 less critical considerations.

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Generally, it is contemplated that callers are coupled into the system only during the bidding on specific items of merchandise. Accordingly, some prequalification may be desirable to facilitate the rapid accumulation of a bidding group with the introduction of a unit of merchandise.

As the auctioneer announces the next item for sale, it is televised to potentially interested bidders. In addition to being informed of the merchandise, potential bidders might also be reminded of the telephone number for participating in the auction. Accordingly, any interested person at a remote terminal T1-Tn may dial the auction number and obtain access to the processing systems P1-Pn. The caller would have a television set available, tuned for example to a cable channel.

Any preliminary qualification as indicated above will then be performed along with any appropriate designation. With regard to the designation, unless

callers are identified as part of the qualification step, the designation unit 96 (FIGURE 4) assigns a limited-digit number to individual callers for use by the auctioneer interfacing the command computer and terminal CT. Further designation and sequencing as disclosed herein also constitute part of the process. To the extent that qualification and designation operations may be performed, the operations are performed as described above with reference to FIGURE 4 by the qualification unit 93 and the designation unit 96. Of course, any of the safeguards and limitations as described herein may be employed as deemed appropriate for an auction format.

After the preliminaries, the auctioneer initiates the bidding with respect to a particular item that is observed by the callers on a television receiver as through a cable channel. Note that the audio may be variously coordinated through the telephone communication facility C and the audio channel of the caller's television. In a simple format, after an introductory phase, communication to callers with respect to the bidding is provided through the television link. Alternatively, the audio unit AD (FIGURE 1) may be employed.

Essentially, the auctioneer initiates the bidding by stating an initial value for the opening bid. Callers are invited to bid by actuating the push buttons 14 (FIGURE 1). For example, the auctioneer may invite an initial bid of one hundred dollars asking callers to so bid by entering an asterisk (\*) by punching the button so designated. In accordance with one operating format, cells in the memory 98 (FIGURE 4) are actuated to register the bidding number in identified relationship with several calls. Note that although a record may be desirable, it is not usually

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Normally at the conclusion of the bidding on a particular item, the contents of the cells in the memory 98 would be purged with only the final bidders being held in general memory within the processing unit 92. Of course, it is important to maintain a record of back-up bidders in the event the sale is not consummated with respect to the first of the highest bidders. That is, a subset of the highest bidders is preserved for each item of merchandise in the event that the highest bidder fails to qualify or the sale otherwise cannot be consummated. Of course, a distinct advantage of the system is the ability to accommodate a vast auction participation group for items of substantial value and as a consequence the distillation of a subset of callers is exceedingly valuable information.

Game shows in accordance herewith may take any of a wide variety of forms as several well known programs in which studio contestants compete for prizes. In utilizing the system of the present invention to involve remote participants, it may be desirable to preliminarily qualify and designate callers as explained above. Specifically, prior to participating in an actual game show, interested participants interface the system as depicted in FIGURE 1, and in the course of an exchange as described above, the qualification unit 93 and the designation unit 96

cooperate with the processing unit 92 to accomplish preliminary data on potential participants in cells of the memory 96.

Various games will involve different screening processes and clearances. For example, a child's television game format may require parental clearance and in that regard written communication may be required for approvals. Such approval may require the assignment of a personal identification number to the child player as qualifying identification data.

As explained above, clearances may be perfected through the look-up table 99 (FIGURE 4) in association with the qualification unit 93 or approvals through a consumable key step may be extended to incorporate functions of the processing unit 92 in association with the memory 98. For example, if qualification simply involves a check-off operation, the look-up table 99 will normally be employed. However, in the case of preregistration for a participant, as in the case of the auction sale, the memory 98 is involved with the qualification unit 93 through the processing unit 92 to establish a data cell C1-Cn for each qualified participant. Thus, each potential participant to be qualified interfaces with the processing unit 92 during a preliminary interval of operation to provide data in one of the cells C1-CN to facilitate qualification for participation during a real-time game show.

At the time of the show, callers are qualified simply by reference to their assigned memory cell data for a verification. Thereafter, the caller's exchange information to supplement their data as with respect to the play which follows. Specifically for example, a caller might select a studio audience participant with whom the caller is to be allied. The

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Next, the caller is greeted and requested to give the key number entitling him to participate in the game show. The instruction constitutes an initial  
15 action to take place in an interval of qualification during the time  $t_1$ . The caller actuates the buttons 14 providing digital representations to the qualification unit 93 (FIGURE 4) and the look-up table 99 is consulted. Note that the table 99 may be a large, shared  
20 unit that tabulates each of the key numbers and accounts for their use. If the caller has identified a proper key number, the process proceeds and the key number is accounted, i.e., incremented or decremented to the limit of use if any. Alternatively, a repeat  
25 information operation may be requested as described in detail above.

As a further check during the qualification stage, the use-rate calculator 100 may function to determine whether or not an excessive number of calls have originated from the designated number. Thus, consideration involves calls or value with reference to a predetermined period of time. Again, a shared calculator may be used or addressing may obtain selectivity on the basis of calling numbers. If a large number of calls have originated from a single

telephone terminal, a fraudulent situation may be suggested. Assuming no such indication occurs, the number of uses is registered in a section 200 (FIGURE 7) and the operation proceeds from the interval t1 to interval t2.

During the interval t2, the sequencer 94 registers the precise time of the call in the buffer storage 97, specifically in a section 204 as illustrated in FIGURE 7. With the entry of such data, the system passes from the operating interval t2 to t3.

The caller is next asked to identify himself in some specific manner. For example, the caller may simply be asked to provide the year of his birth. Alternatively, somewhat comprehensive information may be taken as in the form of drivers' license numbers, social security numbers and so on. Of course, such data may be employed for subsequent identification of the caller and, accordingly, is registered in the buffer storage 97 (FIGURE 4). Specifically, identification information is registered in section 206 of the block 200 as shown in FIGURE 7.

In addition to receiving identification information from a caller, the system assigns a designation to the caller. Specifically, the random number generator 101 (FIGURE 4) provides a number which may be encrypted along with other identification data as the caller's personal identification to provide a numerical designation that is registered in the storage 97. Specifically, the designation is stored in a section 208 as illustrated in FIGURE 7. With the designation operation complete, the interval t3 terminates initiating the data accumulation phase which occurs during an operating interval t4.

At this juncture, operating elements within the processing unit 92 will be considered in relation

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to an explanation of the manner in which select questions are provided to a caller and his answers received and recorded for subsequent processing to determine winners.

5 Preliminarily, reference will be made to  
FIGURE 8 showing elements involved in the operating  
format which are contained in the processing unit 92  
(FIGURE 4) in association with the memory 98. To avoid  
confusion, the elements identified in FIGURE 8 are  
10 designated by fresh numerals.

To accommodate the exemplary operating  
format, a dramatic program might be recorded prepara-  
tory to the television broadcast. A substantial number  
of questions would then be formulated based on the  
15 dramatic program. For example, "How many people were  
present when the will was read?"

It is contemplated that the dramatic program  
would be broadcast to different geographical segments  
of the country during different time intervals. To  
20 accommodate the different time intervals, it is  
proposed to utilize different questions for each  
geographic segment. That is, the basic format can  
remain the same, only the questions change by time zone  
to avoid study and collaboration on questions as a  
25 result of time shifts. A question propounded to a  
Chicago caller should not be repeated to a Los Angeles  
caller. In any event, callers might be given three  
questions randomly drawn from a pool serving one  
geographic segment and three questions drawn from a  
30 different pool serving another geographic segment.

The signals for prompting a voice generator  
are registered in memory sections MS1 through MSn.  
Each of the memory sections MS1-MSn is served by an  
address input AI1-AIn respectively. Similarly, the  
35 address inputs AI1-AIn are instructed by random number

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generators NG1-NGn, in turn actuated by decoders DE1-DEn. Consider the operating sequence of the memory MS1 as an example.

5 The decoder DE1 is responsive to telephone  
calling numbers (provided by ANI equipment) indicative  
of a particular geographic area. Note, for example,  
that area code numbers afford an effective geographic  
classification of callers which is very useful in many  
10 formats or processes of statistical analysis in  
accordance herewith. Note that geographic (or other)  
classification in accordance herewith is also accom-  
plished by the called numbers provided. Each of  
several television stations would solicit calls for  
different numbers as a result, either by DNIS or call  
15 channeling. Select processors would be reached through  
the interface units, e.g. interface 20 FIGURE 1. In  
operation, the decoder DE1 determines a call is from a  
specific geographic area and accordingly provides a  
signal to actuate the random number generator NG1. As  
20 a consequence, the random number generator NG1 provides  
a series of three random numbers in the form of  
addresses for the memory MS1. That is, the addresses  
may simply comprise three alphanumeric bits supplied to  
the address input AI1 to prompt the provision of three  
25 sets of voice generator signals for announcing the  
three questions in sequence. For example, the first  
question might be as suggested above: "Push the button  
on your telephone for the number of persons present in  
the room when the will was read".

30 The voice generator signals are supplied from  
the memory MS1 (within the processing unit 92, FIGURE  
4) to the interface 20 (FIGURE 1) which generates audio  
signals to actuate the caller's hand piece 10.  
Accordingly, the caller is instructed to answer three  
35 questions, the responses being recorded in a section

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210 of the data block 200 (FIGURE 7). Note that the clock 105 (FIGURE 4) may be utilized to limit the response period allowed each caller.

As indicated above, to accommodate broadcast of the program in a different time slot for a different geographic area, the decoder DEn (FIGURE 8) actuates the random number generator NGn to address the memory MSn to provide three different questions as a result of a random selection. Accordingly, within a time or times (perhaps limited and offset) after the conclusion of the program, a substantial number of callers are accounted for in cells of the memory 98 and similar units of the composite system. The cells indicate sequences of calling and also may contain billing data where appropriate. That is, pay-to-dial operations avoid the need for billing, yet it may still be made of record.

Subsequent to the data accumulation phase of operation, the processing unit 92 (and its equivalents) is actuated during an off-line processing interval to isolate the subset of callers correctly responding to the questions. In accordance with one format, the subset of successful callers may be reduced to a sub-subset as by a random computer "draw" to define a group of significant winners. That is, a random number generator may be employed as explained above.

As an alternative to subsequent processing, the system may inform callers of their success during the course of the interface telephone call. That is, callers might simply be informed by cuing the voice generator: "Your answers are correct and in accordance with the program game, you will now be entered in the sweepstakes draw for the prize ...." Thus, the format defines a subset then further selects a sub-subset of winners. In any of the various formats, the status of

Still another operating format for the system takes the form of polling operations to determine opinion or facts. An illustrative form of the format is disclosed below again in association with a television broadcast.

Assume the existence of a system in accordance with the present invention installed for use in association with a television broadcasting facility. Of course, various previous arrangements could be involved; however, according to one arrangement a commentator simply invites members of the viewing audience to call a specific number and express their views with respect to a specific issue. Callers located at terminals T1-Tn (FIGURE 1) activate the terminals to accomplish an interface with one of the processing systems P1-Pn as explained above. Note that the processor (or the interface 20 may involve operation of the qualification unit 93 (FIGURE

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data not counted. Such operation would involve the use-rate calculator 100 in association with the qualification unit 93 performing logic tests to actuate the voice generator of the interface 20 for providing an appropriate interchange with a caller.

With the screening or qualification of a select group of callers, the sequencer 94 (FIGURE 4) may or may not be involved to identify the order of callers. Also, the designation unit 96 may or may not be involved in view of the fact that for many polls there is little interest in subsequently identifying callers.

In the poll-format operation of the system, it is important to provide a capability of defining select intervals during which callers may provide data. In one arrangement, with the consummation of a communication interface between a caller and a processor unit, the audio of the television broadcast is keyed from the audio unit AD through the switch 21 (FIGURE 1) for communication to the caller.

With a multiplicity of callers in interface relationship with the processors PR1-PRn as function units, a polling question is stated, for example: "If you favor expanded trade with ... at the tone press button one; if you do not, press button two".

To control the interval of polling, the command computer terminal CT (FIGURE 1) is actuated to enable the callers timely access to the processors.

At the expiration of a polling interval, the interfaces may be terminated or additional questions may be propounded. In any event, subsequent to the data-gathering phase, the bulk data is supplied to the command computer terminal CT incorporating computing facility to isolate subsets for communication by the broadcast. Accordingly, an effective on-line poll can

be conducted with statistical sampling control and prompt display of responses.

As explained above, the arrangement of the function unit (or units) may be variously embodied in a single processor or many processors, depending on various considerations as time sharing, multiplexing, paralleling and so on. The systems as described above embody the components bulked together in one location. However, components of the system could be spaced apart geographically, using dedicated lines or polling techniques. An illustrative embodiment is shown in FIGURE 9.

Call distributors CD1-CDn are at different geographic locations along with associated interface units IA1-IA<sub>n</sub> and IB1-IB<sub>n</sub>. Each of the interface units, as unit IA1 is coupled to a central processor 251 as indicated by lines 252, 254, 256 and 258. Each of the lines may take the form of a dedicated telephone line or a polling telephonic coupling.

In the operation of the system of FIGURE 9, the call distributors CD are coupled to a telephonic communication system and accordingly allow the interface units I to provide interface communication between the central processing unit 251 and a multitude of remote terminals T1-T<sub>n</sub> as illustrated in FIGURE 1. With data accumulated in the cells, it may be variously down loaded as to a central processing station. Thus, the distributed-component system is capable of executing the various formats as explained above with reference to the illustrative structure.

In view of the above explanation of exemplary systems, it will be appreciated that other embodiments of the present invention may be employed in many applications to accumulate statistical data, process such data, and define subsets of callers of concern.

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While certain exemplary operations have been stated herein, and certain detailed structures have been disclosed, the appropriate scope hereof is deemed to be in accordance with the claims as set forth below.

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